REMARKS

THE DRAWINGS

An objection was made to the drawings due to claims 3 and 4 reciting "inclined grooves," while the drawings only show a single inclined groove. Claims 3 and 4 have been amended to recite "inclined groove," thereby overcoming this objection.

An objection was made to the drawings due to Figure 11 having reference numeral 67 which was not included in the specification. The specification has been amended at page 20, line 10 to amend "mirror 66" to "mirror 67," thereby overcoming this rejection. It is noted that Figures 9 and 10B show groove 66. This amendment thus corrects the duplicated reference numeral.

In addition, in Figure 11, light receiving element 64 has been changed to 69, correcting the duplication of the reference numeral of shield plate 64 in Figure 9.

An objection was made to the drawings with the contention that the cross-sectional views do not have correct cross-hatching lines to represent the appropriate materials for each element. This contention is traversed.

37 C.F.R. §1.84(h)(3) states that hatching must be made by regularly spaced oblique parallel lines. The present drawings have such lines. MPEP §608.02 has symbols for various materials on pages 608-95 and 608-96 (August 2001) and states on page 608-94 "The following symbols should be used to indicate various materials where the material is an important feature of the invention." (Emphasis added.) The material is not an important feature of the claimed invention. Further, this MPEP section states that the indicated symbols should be used; not that they must be used. It is accordingly submitted that this objection should be withdrawn.

An objection was made to the drawings with the contention that Figures 15-19 should be designated by a legend such as Prior Art. The corrected drawings have an appropriate legend, thereby overcoming this objection.

THE SPECIFICATION

An objection was made to the specification due to a typographical error on page 18. This has been corrected in the above amendments, as have other minor typographical errors..

THE CLAIMS

Objection was made to claims 3 and 4 due to the lack of an antecedent for the term "the propagation direction of the light". This has been amended to "the longitudinal direction of the optical waveguide". In claim 1 the waveguide is stated to be elongated. Consequently, the waveguide has a longitudinal direction.

Claims 1-4, 6, 7, and 13 are presently pending in the application. Claims 1-4, 6, and 7 have been amended to more particularly define the invention. Claim 13 has been added to claim an additional feature of the invention. Non-elected claims 5 and 8-12 have been canceled in the interest of expediting prosecution. Applicants reserve the right to file a divisional aplication to the non-elected claims..

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-2 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kropp (U.S. Patent No. 6,227,722 B1) in view of Bruce et al. (U.S. Patent No. 6,312,581 B1).

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kropp and Bruce et al. and further in view of Kawaguchi et al. (U.S. Patent No. 6,361,222 B1).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention is directed to an optical module which includes an elongated optical waveguide 4, an optical waveguide substrate 1 on which the optical waveguide is mounted, and an optical fiber connecting end member 2 with a through hole 13 for accommodating and fixing an end surface of the optical waveguide substrate.

The waveguide substrate has high precision steps 5 formed along both side edges of an upper surface thereof, and the inside of the through hole has steps 15 formed along both side edges of the through hole so as to fit the high precision steps when the waveguide substrate is inserted in the through hole. Consequently, the waveguide substrate can be easily and accurately positioned in the through hole.

II. THE PRIOR ART REFERENCES

A. The Kropp Reference

Kropp discloses a component module that includes a substrate 1 having a top side on which both a plurality of optical waveguides 4 and first positioning structures 12, 13 are created by planar structuring. Joined to the substrate is a plug connector part 20, which has at least one mechanical alignment element23, 24 for mechanical alignment relative to a complementary plug connection partner (not shown). The plug connector part has a joining side facing toward the top side which is provided with second positioning structures 27, 28

that cooperate with the first positioning structures.

B. The Bruce Reference

Bruce discloses a process for fabricating a silica-based optical device on a silicon substrate. The device has a cladding formed in a silicon substrate. The device also has an active region, and that active region is formed on the cladding. The cladding is fabricated by forming a region of porous silicon in the silicon substrate. The porous silicon is then oxidized and densified. After densification, the active region of the device is formed on the cladding.

C. The Kawaguchi, et al. Reference

Kawaguchi discloses an optical device which comprises a substrate, an optical waveguide, a laser diode, photodiodes, and a filter. The substrate is provided with a flat reference surface and a V-groove recessed from the reference surface. A pin is fitted in the V-groove of the device and a V-groove of a connector. The optical waveguide is formed on the reference surface. The optical waveguide is provided with a core and a cladding. The core extends along the reference surface. The laser diode emits a signal light beam with a first wavelength toward the core and the photodiode, individually. The filter transmits the signal light beam with the first wavelength and reflects a signal light beam with a second wavelength. The signal light beam reflected by the filter is received by a photodiode.

III. ARGUMENT

The Examiner alleges that Kropp would have been combined with Bruce, et al. to form the invention of claims 1 and 2 and that Kawaguchi would have been combined with

Kropp and Bruce, et al. to form the invention of claims 3 and 4. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

None of the references shows or suggests an optical module including a waveguide substrate having high precision steps formed in a longitudinal direction along both side edges of an upper surface of the waveguide substrate, and including an optical fiber connecting end member with a through hole having steps formed along the side edges of the through hole so as to fit the high precision steps when the waveguide substrate is inserted in the through hole. Indeed, none of the references shows or suggests high precision steps on a waveguide substrate or steps in a through hole so as to fit the high precision steps.

The Examiner contends that the ribs 68 and grooves 64 of Kropp (see Figure 5) are the steps of claim 1. However, those are clearly ribs and grooves, not steps. As such, the Examiner is ignoring the plain language and meaning of the claim. This, the Examiner is prohibited from doing.

Attached are the definitions of "step," "rib," and "groove" from *Webster's Encyclopedic Unabridged Dictionary of the English Language,* Gramercy Books, 1989. The relevant definition of "step" is "a support for the foot in ascending or descending: *a step of a ladder; a stair of 14 steps.*" Steps 5, 15, 44, 65, 84 in the claimed optical module simulate such steps.

In contrast, the relevant definition of "rib" is "some thing or part resembling a rib in form, position, or use, as a supporting or strengthening part." Kropp's guide bars and ribs 12, 13, 45, 46, 68 meet this definition. Indeed, Kropp purposely used the terms "bars" and "ribs". Kropp did not use the term "step" in the invention. The bars and ribs of Kropp extend from

the surface of Kropp's substrate or his connector, with areas of the substrate or connector on each side of each rib. They are not steps.

The relevant definition of "groove" is "a long narrow cut or indentation occurring in a surface or formed there by some means or agency." Again, Kropp's grooves 27, 28, 63, 64 meet this definition. They are long narrow indentations in the surface of Kropp's substrate or connector, again having areas of the substrate or connector on each side of each groove. Kropp's grooves certainly are not steps. They do not simulate a step of a ladder or of stairs, as the steps of the claimed optical module do.

The steps of the claimed optical module provide carious advantages over Kropp's ribs and grooves. By way of example, the steps permit an easier manufacturing process. Figures 14A-14D depict steps in the manufacturing process. As seen in Figure 14C, steps 5 for two optical modules can be formed by a single tool in a single manufacturing step, followed by separation of the two modules as depicted in Figure 14D.

None of the other prior art references make up for these deficiencies of Kropp.

It is accordingly submitted that the claims distinguish patentably from the references and are allowable. Such action would be appreciated.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-4, 6, 7, and 13, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed

below to discuss any other changes deemed necessary in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 C.F.R. §1.136. The Commissioner is hereby authorized to charge any deficiency in fees, including extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: January 12, 2004

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